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How much severe is a disease? The social construction of the Foot and Mouth Disease

(running title)

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In this communication, we propose to explore the dynamics of social construction of a specific livestock disease, the Foot-and-mouth disease (FMD), with a special emphasis on the issue of the degree of severity of the disease. This question has been largely neglected in the social science literature studying diseases and associated risks, in both human and animal health fields. As Adam Burgess (2006) underlines, despite the dominance of the constructionist approaches in risk research, in most studies, risk remains given and objectified and is not sufficiently deconstructed and empirically explored. Similarly Judith Green (2009: 494) underlines that research and theory that is self–consciously ‘about risk’ appears to offer progressively less that is empirically or theoretically insightful. Indeed, the issue of the “real” impact of a risk raises issues related to the nature of the risk itself and to its ontological status.

In the literature on animal disease and health, a variety of approaches have been developed, with a diversity of focuses, at national and/or local scales: socio-psychology, political ecology, explorations of the expert-lay knowledge divide, cultural or ethno-veterinary knowledge studies. But almost none of these works raises the question of the severity of the disease, be it in its objective/concrete or subjective/perceived dimensions. In this communication, we present the case of the FMD, with a view at exploring the evolution of the definition of such a disease in time and space, and of its perceived severity in relation with international and national policies implemented in this field. By severity of the disease, we mean taking into account both bodily manifestations of it, i.e. physiological dimensions, and its impacts on the economic and social activities. Such an approach allows introducing political dimensions in the analysis of what makes the reality of a risk.

From a biological point of view, the FMD is an infectious disease caused by a virus which mainly affects cattle (as well as pigs, sheep and goats). This disease very rarely causes death; it mainly provokes blisters on the mouths and feet of the cattle, consequent lameness, and fewer (and, sometimes, anorexia). There is no effective treatment for infected animals but they generally recover with time. The economic consequences of the FMD are very different depending on the socio-technical context: they are huge on modernized intensive industrial cattle growing units, whereas

they are much lower on extensive traditional herding. As we will show in the course of this communication, these two types of cattle growing are very differently affected by FMD regulations and policies implemented.

In the first part we show that the FMD gone through three main stages: in the first period (XVI-XIXth century) the FMD is identified as an entity by scientists; in the second (XIX-XXth century), the FMD is constructed as a technological disease by the European cattle industry and as collective risk by States; and in the third and contemporary stage (XXIst century), the FMD is framed as a global risk by international organisations. In the second part of this communication, we describe the different policy tools that have been defined and implemented at the international level and its national and local consequences. The question then raises:

First, the qualification of the disease and of its severity is contingent to its undertaking by the scientific community, and will depend on specific dynamics such as disciplinary and paradigmatic competition that are proper to the academic and scientific community. Second, the degree of severity of a disease depends directly on the socio-technical context in which it appears; specifically, the FMD is a crucial disease and represents an important economic risk in modern intensified commercial cattle farm, whereas it is only a peripherical event for the farmer traditional herding. Third and finally, the degree of severity of the disease and its associated risk is also directly and heavily impacted by the institutional context and the public policies and regulations implemented.

Part 1. The three stages of the social construction of the FMD

- **XVI-XIXth century: The FMD is identified by scientists as an animal disease**

According to Rosenberg (1997: xiii) « In some ways disease does not exist until we have agreed that it does, by perceiving, naming it, and responding to it". According to this, although a disease with similar clinical signs, was described by Aristote in 323 av. JC, we can consider that the history of the FMD only begins in 1546, when it was first described and named as such by Girolamo Fracastor, a physician practitioner, to describe a cattle outbreak that had occurred in Italia in 1514. The virus has only been identified in 1897 (Blancou 2010).

From the beginning, the FMD has been subject to scientific controversies. The oldest one was regarding the spreading process of the disease, in the broader theoretical debate on miasma *versus* germs (Woods 2004). Much more recently, the debates regard the possibility or not for vaccinated animals to spread the disease (Garland and de Clercq 2011) and the efficacy/inefficiency of massive culling in limiting its spread (Charleston, 2011).

- **XIX-XXth century: The FMD as a production disease and the necessary intervention of the State**

Until the mid 1800s, animal diseases were handled by farmers, through on-farm mitigation measures, based on traditional knowledge. Since the late 1700s however, regular outbreaks of rinderpest took place in Europe, with high rates of mortality on cattle, which gave birth to the adoption of the first national regulations in this field. The first outbreaks of FMD were recorded in Britain in 1839 and first considered as a mild and unpreventable ailment. However, with the success of the control of rinderpest, and its positive side effects on FMD outbreaks due to the better

monitoring of sanitary conditions in the sector, the idea of a broader State intervention in the management of animal disease, including FMD, gained pace (Wood 2004).

Such a plan gave rise to very intense debates among the actors involved. Most farmers resisted the inclusion of FMD in the set of diseases to be managed by the State, arguing that the regulations would bring more constraints than the disease itself. However, with the technical modernisation of farms within the country and the development of more intensive cattle farms, the perception of the disease progressively changed due to the limits imposed on productivity gains by the endemic presence of the disease. In this sense we can qualify the FMD since this period as a "production disease" as defined by Payne in 1972 (quoted by Joshi and Herd 2006). The definition of a production disease refers to production and productivity aspects, i.e. metabolic disorders, imbalances between input and output, inadequate intake of the various nutrients needed for production. More precisely, "production disease is a man made problem; it consists of a breakdown of the various metabolism systems of the body under the combined strain of high production and modern intensive husbandry".

As a consequence of such an evolution in the dominant representations, while rival interpretations and prescriptions were highly debated, the process finally conducted to the negotiated adoption of a first set of measures targeted at FMD control. The subsequent administrative controls of FMD made the disease more visible and indirectly increased its perceived severity in the rural economy, simultaneously reconfiguring the opinion so that "by about 1890, FMD came to be linked with the horrors of cattle plague rather than the recurrent sicknesses always attendant on agriculture" (Woods 2004: 25).

- **XX-XXIst century: the FMD as a global risk**

In the late 1800s, the FMD is an endemic disease in many European countries since the 1860s. Through cattle trade, it has been spreading from Europe to its different colonies and from colonies to colonies. That is why this disease was included in the mandate of the Organisation Internationale des Epizooties (OIE) since its in 1924 (together with rinderpest, rabies, tuberculosis)[1]. The 28 countries who founded the OIE engaged themselves to notify and to make known, through the new organisation, any useful information on the evolution of the sanitary situation on their territory.

The OIE saw its mandate progressively enlarged to include many other tasks such as the publication of health standards for international trade in animals and animal products in 1994 (under the World Trade Organisation –WTO- and Sanitary and phytosanitary –SPS- measures agreement), and the production of guidelines and expertise for animal welfare and food safety in 2001 (OIE 2007). At the international level in this period, the FMD is mainly conceived as a barrier to trade.

Beginning in the early 2000s, the management of animal diseases at the international level evolves in relation of the adoption of the "One World, One Health" paradigm with a shift from international management to global governance (Figuie, 2013). The title of the organization changes for "World Organisation for Animal Health" and its mandate shifts from controlling animal diseases spread to ensuring animal health in the world. In such an evolving context, the definition of the FMD also evolves to become « a high priority disease that should be combated synchronously on a global scale

[1] The triggering factor in the creation of the organisation was rinderpest appearance in Europe: it followed the transit in 1920 through the port of Antwerp of zebu cattle coming from South East Asia and bound for Brazil.

for the benefit of all countries; (FAO and OIE, 2012: 3). From a simple barrier to trade, the FMD has thus become a dangerous threat on food security and its eradication is targeted as a global public good, as the following quotations illustrate:

> "The control of FMD has always been one of the main concerns of the OIE and the proposals put forward are fully in line with previous programmes. However, the time has come to take a new step forward and, building on previous advances, embark on a phase involving the development and implementation of a global control programme, with particular emphasis on regions of the world where the disease remains enzootic and which represent an increasingly serious threat to FMD free countries. Defining a global strategy and convincing governments and donors to make a proactive commitment are among the conclusions and recommendations of the OIE/FAO Global Conference on FMD, held in Asunción, Paraguay, in June 2009" (Domenech, 2011: 6).
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> "Controlling Transboundary Animal Diseases (TADs) such as FMD at source is a shared interest between infected and uninfected countries and should be considered a Global Public Good". (FAO and OIE, 2012: 1).

Part 2. FMD management and control policies and their uneven socio-economic impacts

As we have shown above, the definition of the FMD has switched from a familiar disease handled at the farm level through routine practices, towards a major plague that must be eradicated with FMD control strategies conceived as global public goods. In this section, we look at the international regulations and policy tools implemented in this objective as well as at their social and economic impacts.

- **Tools for FMD control at national and international levels**

The policy tools defined at the international level to control FMD are twofold. One the one hand we find measures of "geographical sequestration" (King quoting Laurie Garrett, 2004: 773). According to these measures, State Members have the obligation to notify to the OIE any outbreak of FMD on their territory. In accordance to the information received from the national level, the corresponding country (or specific regions within the country) is delivered -or not delivered- the so-called "FMD free status" by the OIE. This international policy has important impacts in terms of trade. If an exporting country is not delivered the FMD free status, other countries are allowed to ban its products from importation (which is totally forbidden by WTO rules in case FMD free status). FMD is thus regarded as an important international constraint to movement of animal commodities and products across country borders.

In case of an FMD outbreak, international rules require sanitary measures to be applied. The so-called "Contingency Planning includes the "destruction of all infected, recovered and FMD-susceptible contact animals" on a large (various kilometres) area around the detected animal(s). It also includes strict quarantine, control of vehicles, etc. In the UK for example, during the 2001 FMD outbreak, 700.000 animals were culled (despite the fact that only a marginal number of them were infected by the virus (Charleston, 2011)) and access to the countryside (especially for leisure) was heavily restricted to the point that the tourism industry was affected.

Such an international policy has structural and long-standing implications within cattle exporting countries, especially regarding the territorial organization. For example in Zimbabwe, the national FMD management policy is based on the distinction between three types of areas. FMD free zones with export oriented commercial cattle units are separated from wild areas containing buffalos (healthy carriers of the FMD) which often correspond to ecological conservation areas, by buffer zones. In these buffer zones traditional farmers grow native cattle; the movement of cattle is strictly restricted within these areas, by fences on the side of the parks and by vet fences on the side of the commercial areas (cordon patrols and quarantine) (Thomson & Bastos, 2004).

More recently, two accompanying types of tools have been developed at the international level, which have considerably increased international interferences with the national levels. The first one is the so-called OIE "Tool for the Evaluation of Performance of Veterinary Services"): member states can ask OIE experts to inspect their veterinary services and to help them at improving their quality with regards to FMD (and other major diseases) control. The second one is the so-called Progressive Control Pathway for FMD control (PCP-FMD). This tool defines the successive steps for a country to follow in order to achieve the FMD free status. Although both of these tools are supposed to be used on a voluntary basis by the countries, one can note that donors (especially the World Bank) are more willing to provide funds to countries willing to develop their cattle sector if they do apply these tools. In sum, this can be considered as a rather powerful incentive for the countries to ask for international inspection and intrusion.

- **Economic and social impact of current FMD management measures**

Cost/benefit analyses have long been the main tool used by policy-makers to justify their strict and rather radical approach to the disease. Envisaged benefits from FMD eradication were supposed to largely compensate the high costs of the policy[2]. However, although such arguments might apply for rich and developed countries, the situation is different for developing and poor countries.

In Zimbabwe for example, a country which has inherited a commercial export oriented sector from the colonial period, the picture is the following: cost / benefit analysis shows a positive impact of FMD control policies (according to OIE rules) at a national aggregated level. A study by Perry and colleagues (2003) shows that for every 1US $ that Zimbabwe disinvests from the FMD control programme, a further US $ 5 is lost by the country (nota: in this simulation, effects on neighbour countries and on the spread of other diseases are not included). Reversely, for every 1 US $ invested in fences and veterinary services infrastructures there would be returns of approximately US $ 1.5 (Perry &al, 2003).

However, the cost/benefit analysis conclusions diverge sharply when looking at disaggregated data. As we have already underlined, FMD has dramatically different impacts on the different types of cattle growers. So have the FMD management and control policies. As they prevent bovine meat and cattle exporters to see their exports banned on the high value Northern markets, the FMD measures have clearly a positive impact for the livestock industry (which represents less than 2% of cattle farmers in the country). On the contrary, smallholders and poor households -especially the poor farmers living in the buffer zones, fully bear the costs and constraints of the policy with no benefiting from it at all. As

[22] « The potential impact to Europe was clearly illustrated by the 2001 outbreaks in the UK, and subsequently to other member states in north-western Europe, resulting in the loss of millions of animals at a direct cost of more than €12 billion". (EFSA).

Perry & al (2003) have calculated, only 16% of the benefit earned by Zimbabwe from the FMD policy actually goes to low income (rural and urban included) households.

Similar results have been found in the case of the Philippines (Randolph & al., 2002).

In the last decade, in reaction to these uneven and unfair effects of FMD policies, some voices have raised to propose alternative measures. This is notably the case in the SADC region, in which FMD measures also directly conflict with conservation policies (notably in relation to fences surrounding the park and impeaching wild animal movements –the so-called ecological continuity). With the argument to both conserve wildlife and preserve livelihoods relying on traditional herding, the SADC region proposes to implement "non geographic approaches for management of FMD diseases"[3]. Such measures are also labelled as "Commodity-based trade" (CBT); they are base on the assumption that the eradication of the FMD will not be possible in Africa due to the endemic presence of the disease in wildlife. The CBT approach thus suggests to shift from certification of territorial areas as FMD free (i.e. the current OIE approach) to certification of safe meat products, which is to be achieved through on farm controls of animal (epidemiological surveillance) and meat production chains certification (slaughtering, packaging, transport). These alternative measures have been debated in terms of their level of applicability and of their potential impacts on small farmers' incomes. They are currently only implemented in the frame of field trial experiments.

Conclusion

The Foot and Mouth Disease case is a fascinating one to illustrate the social construction of a disease in the field of animal health and its associated level of severity. As we have shown, the representation of the FMD and its associated level of severity have varied a great deal upon time. It was initially constructed as a familiar disease with few consequences, which was to be handled at the farm level through routine practices. From a natural disease with little impact on life and economic activity, the FMD has first converted into a production disease, circumvented to a specific economic sector and to be dealt with on a professional basis. It has then progressively become framed as a major plague that must be eradicated worldwide, and whose eradication is conceived as global public goods. Socio-technical changes and public regulations have been the main drivers of these evolutions. Based on geographical sequestration, consequent segregation between types of growers, and massive culling in case of outbreaks, we have described the dramatically uneven impacts of FMD measures. If big cattle growers undoubtedly benefit from current FMD control measures, this is obviously not the case for smallholders, particularly in developing countries: peasants in the buffer zones cannot move their cattle freely, and despite the fact that the disease has very few direct impacts on their livestock and that they have no interest in international markets, they are on the first line in case of outbreak (culling of the animals).

In sum, we could conclude that far from reducing the severity of the disease, public regulations –and in particular international regulations- have rather contributed to its amplification. Of course the present communication is a work in progress. It deserves further explorations of the role of the different actors at stake in this evolution. We plan to give a special attention on the one hand to

[3] See http://www.wcs-ahead.org/phakalane_declaration.html

interactions among economic interest groups among themselves and with governments and international organisations, and on the other hand to the role of representations, i.e. specifically including veterinary science debates (disciplinary and paradigmatic competition dynamics) and competing approaches of modernization and progress.

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